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ON THE RELATION OF THE FUNCTIONS OF THE GLANDS OF INTERNAL SECRETION TO THE THINKING, THE FEELING, AND THE STRIVING OF MAN.*

LEWELLYS F. BARKER, M.D.,
Baltimore, Maryland.

When your President, Dr. H. Mason Smith, honored me with the invitation to address you at this annual session, and asked me to speak upon some subject that I thought would be of interest to general practitioners, I decided to devote my remarks to "The Relation of the Functions of the Glands of Internal Secretion to the Thinking, the Feeling, and the Striving of Man."

In selecting this topic, I recognize its dangers. Not only in medical literature but also in lay literature there has been an inclination on the part of some to go far beyond actual knowledge in this domain and to indulge in the most fanciful speculations. This unbridling of fantasy has led to a profound reaction in the medical profession, so profound indeed that there have been some who look upon the rise of endocrinology as a "fiasco" and who would appear to regard even conservative discussions of the topic as ill-timed if not actually unethical!

Both attitudes represent extremes. Uncritical enthusiasm is certainly to be deprecated; but pessimism that is blind to genuine advances in an important field is similarly blameworthy. *In medio tutissimus ibis.* In the hope that an appraisal of the actual status of one phase of endocrinological research, namely the influence of the internal secretions upon the human psyche, might prove interesting to this audience, I have decided to limit my remarks to a brief discussion of it.

Every practitioner is more or less familiar with the classical endocrine syndromes and with the fact that these syndromes are made up not of physical symptoms and signs alone but also of mental symptoms—disturbances of thinking, of feeling and of striving. Moreover, all practitioners meet from time to time with outspokenly psychotic patients, some of whom have to be sent to closed institutions because of the better treatment that they can receive there and because of the difficulty in caring for them outside; careful studies of such psychotic patients not infrequently reveal evidences of coexisting endocrine disturbances. This association of mental disturbances with major endocrine syndromes, on the one hand, and of endocrine disturbances with major psychiatric syndromes, on the other, can scarcely be any accident. We can here be fairly sure of the existence of causal relationships and it is certainly our duty earnestly to seek for them.

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DISTURBANCES OF THINKING, OF FEELING AND OF STRIVING OBSERVABLE IN ASSOCIATION WITH OUTSPOKEN DISEASES OF THE ENDOCRINE GLANDS

Among the glands of internal secretion, those that have been best studied are the thyroid, the parathyroids, the hypophysis cerebri or pituitary gland, the epiphysis cerebri or pineal gland, the islands of Langerhans in the pancreas, the thymus gland, the chromaffin system of the suprarenal glands, the interrenal system of the same glands, and the gonads or genital glands.

Diseases of certain of these glands are far better understood than are those of others of the group. Thus we know most, perhaps, regarding the symptoms that accompany diseases of the thyroid, of the parathyroids and of the hypophysis cerebri. Gradually, however, the symptoms referable to disturbance of the internal secretory functions of the pancreas, of the suprarenals, and of the gonads, are becoming better understood also. Time will not permit me to discuss the symptomatology of all the endocrinopathies, but with your consent I shall choose a few of the more outstanding clinical pictures, laying especial emphasis upon the abnormal psychic manifestations that are a part of them.

Starting with diseases of the *thyroid* gland—the thyroepathies—you will recall that there are two striking clinical pictures not infrequently encountered: (1) Graves' disease, or exophthalmic goiter, which is believed to be due to an over-function of the gland; and (2) myxedema, due either to absence of the gland or to underfunction thereof. In exophthalmic goitre the

main symptoms are the protrusion of the eyeballs, the enlargement and pulsation of the thyroid gland known as goiter or struma, the fine tremor of the fingers, the increased pulse rate, the tendency to loss of weight, the evidences of vasomotor instability, the look of anxiety on the face, the hurried restless movements exhibited, the hypersensitiveness to mental stimuli, the irritability, the restlessness, the sleeplessness, and the marked acceleration of the basal metabolic rate. Patients suffering from this malady often exhibit also character anomalies; sometimes they suffer from pathological fears, obsessions, or ideas of injury; occasionally, they show marked excitement not unlike that seen in hypomanic states. In myxedema, on the other hand, in which we have to deal with under-function of the thyroid gland, the patients present an entirely different physical appearance and a strikingly different mental state and behavior. The skin is dry and wrinkled, the hair tends to fall out, there is a tendency to obesity, digestion and excretion are slowed, the voluntary movements are slow, stiff and clumsy, there is sensitiveness to cold, the facial expression is apathetic and quiet, the patients seem drowsy and dull, their thoughts come slowly, their emotional reactions are sluggish, and, finally, determinations of the basal metabolic rate reveal a retardation much below the normal.

Now, though the disturbances of thinking, feeling and striving to which I have referred are frequent in Graves' disease and in myxedema (though very different in the two conditions), it is relatively rare that outspoken psychoses occur either with over-function or under-function of the thyroid gland; and, when they do occur, these psychoses appear to have their origin in an associated psychopathic inheritance rather than in the endocrine anomalies alone. This has been so not only in my own experience but in that of many authors who have made a careful study of the relationships (Massarotti, 1914; McCord and Haynes, 1917; and Foss and Jackson, 1924.)

On removal of the *parathyroid* glands at surgical operations for goiter (before the baneful effects of parathyroidectomy were known) tetany often developed. Sometimes parathyroid insufficiency arises independently of surgery and gives rise to the same tetany syndrome. Every practitioner must have seen, at one time or another, a case of tetany with its typical tonic spasms. You will recall the peculiar form assumed by the hand (the so-called "obstetrical hand"); or, perhaps, spasms of both the hands and the feet (the so-called "carpo-pedal spasms"). The electrical excitability of the muscles and the nerves is increased, as can be readily shown by exact measurements. Moreover, there is increased mechanical excitability of the muscles and nerves in tetany, for if we percuss over the facial nerve, contractions will occur in the muscles innervated by all three divisions of that nerve, or if we compress the nerves of the upper arm we can elicit flexion of the forearm and a typical obstetrical hand (the so-called "Trousseau's sign"). When parathyroid insufficiency has lasted for a long time (chronic tetany) marked disturbances of nutrition become manifest, including defects of the enamel of the teeth, perinuclear cataracts, and certain abnormal mental states (irritability, fatigability, drowsiness). The calcium content of the blood is diminished and the acid-base equilibrium is abnormally unstable in tetany. Outspoken psychoses are, however, rare in association with tetany; though they may occur in association with parathyreopathies, they are, like those that are associated with the thyreopathies, to be explained rather by some special disposition of the nervous system (hereditary or acquired) than by the associated parathyreopathic influence.

In diseases of the *pituitary gland (hypophysis cerebri)* we may see, on the one hand, acromegaly due to over-function of the gland or, on the other, dystrophia-adiposo-genitalis (Fröhlich's syndrome) due to under-function of the gland. You doubtless all recall the main features of acromegaly—the enlargement of the hands and feet, the prominent up-curved chin, the projecting malar bones and prominent supra-orbital arches, the hexagonal-shaped face, the so-called "nut-cracker" profile, and the marked kyphosis. The disease develops gradually; the patients notice that they have to use larger shoes, to buy larger sized gloves and larger sized collars and hats. In association with acromegaly there may be marked mental disturbances, most frequently of a hypomanic character (tendency to push of talk, acceleration of movements and thought, egocentricity, etc.). When there is under-function of the pituitary gland (as in dystrophia-adiposo-genitalis) we meet with a peculiar form of obesity, in which the fat tends to accumulate in the proximal portions of the extremities, about the breasts and about the ab-

domen. Upon the surface of the body there is less hair than normal (hypotrichosis), and if the hypopituitarism has existed in childhood the axillary hairs and the pubic hairs do not develop. The menstrual function may not appear, or, if it appears, there may be long periods of amenorrhœa. The psyche of these patients is nearly always subnormal. They may be happy, sometimes indeed they are a little elated, but there is nearly always some slight reduction of the mental powers—the judgment is poor and there are periods of drowsiness and mental dulness.

Paul Büchler (1923) has discussed the psychic disturbances met with in the course of these diseases of the pituitary gland. He emphasizes the fact, now well-known, that lesions in the floor of the third ventricle may give rise to clinical pictures very similar to those due to diseases of the pituitary gland itself. Certain cases of pituitary diseases run their course without marked psychical peculiarities, others show slight psychical defects, and only a few exhibit well-defined psychoses. When psychoses of the manic-depressive type or of the schizophrenic type appear in the course of hypophyseal disease they are, in my opinion, dependent upon constitutional anomalies other than the endocrine disturbance.

That, however, hypomanic states may be due to over-function of the pituitary gland and that a moderate grade of imbecility may depend upon under-function of the pituitary gland are facts that seem to me to be well founded.

Deficiency of the endocrine function of the *pancreas*, the cause of diabetes mellitus, in which the sugar in the blood is markedly increased and sugar goes over into the urine, may be accompanied by mental disturbances, but these disturbances are so irregular that in most cases their relations to under-function of the cells of the islands of Langerhans are not clear. The psychic manifestations of the presence of an excess of the internal secretion of the pancreas (hyperinsulinæmia) in the blood are well seen in the so-called hypoglycæmic crisis or insulin shock, in which the patient may go to sleep and remain asleep for several hours—a form of narcolepsy with which we have become quite familiar since the advent of insulin therapy for diabetes mellitus.

Much stress has been laid upon the relation of the internal secretion of the *sex glands*, or *gonads*, to human thought, feeling and behavior. In this connection, the study of eunuchs (castrated persons) and of eunuchoids (persons in whom the gonads do not develop normally) has been very illuminating. When the testicles are removed in childhood, the body and mind develop somewhat abnormally. A special sect in the Orient—the so-called Skopzi—castrates many of its males in youth, and the bodily and mental characteristics of the eunuchs that result have been thoroughly studied by Tandler and Grosz. Similar bodily and mental phenomena are met with in eunuchoids. In such persons (both eunuchs and eunuchoids) the extremities grow to be unusually long, owing to failure of the epiphyses of the long bones to unite at the proper time with the diaphyses; the hair upon the body shows an abnormal distribution; and the patients look drowsy and are apathetic. Some of them manifest anti-social or asocial behavior; thus, they may exhibit criminal tendencies, and they exhibit a peculiar taciturnity and a tendency to seclusion. Here we see exemplified, apparently, disturbances of "feeling" and of "will," due to deficiency of an endocrine product.

That the functions of the reproductive organs in the female, also, have a definite influence upon mental states is well-known, not only to every physician but also to every layman. The relations of menstrual periods, on the one hand, and of the menopause, on the other, to disturbances of the psyche in women can scarcely have been overlooked by any person of experience.

The human *suprarenal gland* consists of two parts, the medulla, which manufactures epinephrin (adrenalin), and the cortex, which corresponds to the interrenal gland of certain lower animals. In diseases of the suprarenal gland, the symptoms that develop depend upon whether the medulla or chromaffin part, the cortex or interrenal part, or both parts, are diseased and to what extent. The epinephrin produced by the medullary portion of the suprarenal gland is a sensitizer of the sympathetic nervous system. When there is under-activity of the medulla of the suprarenal gland, vagotonic states may develop, because of the under-activity of the opposing sympathetic which results from the diminished production of epinephrin. When the medulla of the suprarenal is over-active, however, the phenomena of sympathicotonia may develop; the blood pressure in such patients tends to be higher than normal. When the cortex (inter-

renal portion) of the suprarenal gland is deficient in its internal secretion, Addison's disease makes its appearance with its well-known symptoms—weakness, low blood pressure, digestive disturbances, and pigmentation of the skin and mucous membranes. In this disease, the patients often exhibit anxiety, fear, and a tendency to querulousness. When, on the other hand, there is over-activity of the cortex of the suprarenal glands, due either to hyperplasia or to the presence of tumor (hypernephroma), the clinical syndromes that result vary with the time of life at which the over-activity of the cortex appears. Thus, if it occur during intra-uterine life, the child born is a "pseudo-hermaphrodite," the sex organs resembling both those of the male and those of the female. If the over-activity occur in early childhood, we meet with those peculiar states known as "premature puberty," in which little girls or little boys develop the bodily sex characteristics and the sexual mental states of maturity. But, if the over-activity of the suprarenal cortex do not develop until adulthood, we may see a peculiar transformation in both somatic and psychic domains, particularly in women, who may grow beards, moustaches or may develop hair all over their bodies (hirsutism) and become markedly vigorous and masculine in type (virilism). The "bearded ladies" of the side-shows are examples of such suprarenal virilism.

I could go on to other instances of mental disturbance associated with still other endocrinopathies, but those already cited will perhaps illustrate well enough the principle under discussion.

It should be borne in mind, especially, that the internal secretions stand in very close relation to the functions of the vegetative nervous system (sympathetic and para-sympathetic), and that the latter in turn are closely related to emotional states, a fact that probably accounts for the association of abnormal moods and of anomalies of character and temperament with the more outspoken diseases of the endocrine organs.

ENDOCRINE SIGNS AND SYMPTOMS OBSERVABLE IN PATIENTS SUFFERING FROM MAJOR PSYCHOSES AND IN THOSE MANIFESTING IDIOCY OR IMBECILITY

Because of the similarity of some of the mental states met with in endocrine disease to certain of the psychoses and certain of the mental deficiencies, the conception gradually arose that the endogenous psychoses themselves and perhaps the congenital psychic inferiorities could in one way or another be proven to be dependent upon endocrine abnormalities. This view has stimulated both clinicians and pathologists to careful studies of symptomatology on the one hand and of autopsy findings on the other. Let us see in how far the conception is borne out by the facts thus far accumulated.

Take for example the form of mental disorder known as *manic-depressive psychosis*. Persons suffering from this psychosis may exhibit either a melancholic state or a manic state, or they may manifest first one and then the other (as in the circular types). In melancholia, the sad expression of the face is very characteristic; the patient looks down rather than up, the angles of the mouth are drawn down, the wrinkles in the face are increased, and the patient cannot smile, but weeps on slight provocation. There is loss of interest, inability to concentrate, and a feeling that life is not worth living. Along with these symptoms, there is a tendency to self-blame and to outspoken ideas of unworthiness, of poverty and, perhaps, of actual sin. The mental torture suffered by these patients is so unbearable that frequently they try to end their lives; indeed, in severe cases, the patients must be watched closely if suicide is to be prevented. In the manic phase of the manic-depressive psychosis, the symptoms are of a precisely opposite nature. The patients are elated, or exalted, rather than depressed. Their thoughts come quickly. They speak and move rapidly. Everything is easy for them; nothing seems to be any effort. They exhibit "pressure of activity" and they feel that they have great power. Physicians meet with every gradation from the milder forms of maniacal excitement to the severer forms in which the patients become actually furious, tearing the clothes from their bodies and injuring themselves or others. In the circular forms of the manic-depressive psychosis, in which the same patient at one time exhibits a melancholic state, at another a manic state, we have opportunity to observe one of the most marked contrasts that human life affords.

Just here let me call your attention to the fact that, among people who are not actually insane, there may be an inborn tendency to similar transitions from states of mild elation to states of mild depression, the so-called mild *cyclothymic states*. Indeed, many of the persons whom we

think of as being very well and very happy are in reality very slightly hypomanic, whereas many of the people we know who are moody, taciturn, and a little sad and seclusive are persons of hypomelancholic trend, in both instances because of inherited elation-depression constitution.

The more I see of *psychoneurotic states* (inclusive of neurasthenic states, and psychasthenic states), the more I am impressed with their possible relationships to the cycloid constitution on the one hand or to the schizoid constitution on the other. Environmental influences are of course important in the production of these states, but in almost all instances the study of family histories reveals evidence supportive of the idea that inherited constitutional dispositions may be even more important than the environmental factors.

The similarity of milder manic states to the mental disturbances met with in exophthalmic goiter and the resemblance of the milder depressive states to the apathy, depression, and slowness of thought and movement characteristic of myxedematous patients naturally led many to think of the possibility that the manic-depressive psychosis itself may be thyreopathic in origin. But careful studies of thyreopathic patients on the one hand and of manic-depressive patients on the other yields very little evidence for the view that the elation and depression of the manic-depressive psychosis are due to disturbances of the thyroid function. There is always danger in assuming genetic relationship merely because of similarity of symptomatology. One cannot be too careful to avoid being led into false ideas of etiology on such grounds.

Let us consider next the group of deteriorative adolescent psychoses known as *dementia præcox* or *schizophrenia*. The idea that the origin of dementia præcox is to be sought in disturbances of the internal secretion of the gonads has been widely disseminated, but in my opinion without sufficient reason. The onset of dementia præcox at the puberty phase of development lent color to the view.

For a time, too, studies with Abderhalden's reaction seemed to support the idea. Later investigations have shown the fallacy of relying too much upon Abderhalden's reaction in etiological studies.

Moreover, though the internal secretion of the gonads does play a part, and a very important part, in producing bodily and mental changes at the period of puberty, leading as it does to an erotization of the body, it must be borne in mind, as R. Fischer has emphasized, that the puberty psyche is a much more complex affair than mere erotization. Again, it should not be forgotten that the onset of schizophrenic psychoses need not necessarily coincide with the advent of puberty and adolescence.

As you know, it has been customary to divide patients suffering from dementia præcox into three main groups: (1) the *hebephrenics*, (2) the *catatonics* and (3) the *paranoid dements*. In all three groups there are evidences of dissociation of the personality—of disharmony between the life of feeling and the life of thought; often the psychomotility is in disagreement with the total psyche. The patients are apathetic and negativistic; they often exhibit rigidity of the musculature, stereotyped movements or attitudes, and bizarre, unaccountable behavior; often, too, they have hallucinations—they hear voices, see visions; and they may harbor delusions, especially pathological ideas of persecution.

Schizophrenic patients may, it is true, show some signs and symptoms of endocrine disturbance, but these need not be marked; and, moreover, from endocrinopathies alone we never see the clinical picture of hebephrenia, of catatonia or of paranoid dementia. In dementia præcox there appears to be an inherited disposition to the disease, a disposition that involves the central nervous system itself in addition to any congenital abnormalities of endocrine or other organs that may coexist.

Attempts have been made by some to bring *idiopathic epilepsy* into the domain of the endocrinopathies; but here, again, I believe that enthusiasm has outrun available facts. There are, it is true, certain endocrine diseases in which there is a tendency to elementary spasm; but, in my opinion, constitutional or idiopathic epilepsy is far too complex a problem to be explained by any endocrine data that are as yet at our disposal.

The psychoses met with in association with various infections and intoxications, so-called *toxic-infectious psychoses* or *exogenous reaction types of Bonhoeffer*, are striking in that the mental phenomena resemble one another very closely, even when the known exogenous etiological factors are quite dissimilar. This has led some investigators to believe in the existence of preformed mechanisms that come into play under

the influence of various exogenous injuries. The plausible hypothesis has been suggested that certain constitutional links must be interpolated between the poisons from the outside and the neuropsychic reactions that result, and it has been held possible that the endocrine glands are those links—that, in other words, the glands of internal secretion may be responsible for such transformation of heterogeneous stimuli as will account for the similarity of the reactions exhibited in very different intoxications and infections. If this view be true, it is tantamount to saying that the external poisons do not act so much upon the brain directly as indirectly through the intermediation of the endocrine glands. The suggestion is an interesting one and worthy of careful test, though it should not yet be accepted as demonstrated.

More popular still is the idea that *idiocy and imbecility* are directly related to endocrine deficiency of one sort or another. The fact that acute thyroiditis may develop as a complication of infections in childhood, the fact that the pituitary gland is often involved in hereditary syphilis, and the fact that the thymus gland may be implicated in diseases of early life, particularly in persons who later on exhibit signs of imbecility or idiocy, has seemed to lend some corroboration to the view of an endocrine origin of at least part of the congenital mental deficiencies and especially of those that are acquired in very early life.

In the examination of cretins, goiter and signs of thyroid insufficiency are common findings; but cretinism is something more than mere thyroid insufficiency and myxoedema of childhood is by no means identical with endemic cretinism. The administration of thyroid extract in cretinism is of some value but it does not help a cretin so much as it will help a child who suffers from simple myxoedema.

Various attempts have been made to establish relationships between thymic defects and epileptic idiocy, between defects of the pituitary gland and erethic forms of imbecility, and between defects of the thyroid and parathyroid glands and so-called Mongoloid idiocy. These researches, though interesting, are still in flux, as are those bearing upon the possible endocrine origin of spasmophilia, of achondroplasia and of other disorders met with during development.

You must have met in the medical literature frequently with the term "endocrine formula" as applied to constitutions and personalities. But because this term "endocrine formula" has been introduced into the literature, you should not be deceived into thinking that the determination of the endocrine formula of a constitution or a personality is any easy matter.

Moreover, you must, all of you, by this time have become well acquainted with the fallacies of the much-vaunted endocrine therapies for mental deficiencies and for psychotic states. Nothing seems to me much more tragic than the necessity of disappointing the hopes of a pair of fond parents with regard to the discovery, by their physician, of the needed endocrine products to remove the imbecility of their child!

CONSTITUTION, TEMPERAMENT, CHARACTER AND ENDOCRINE MAKE-UP

The tendency of internal medicine today is to study single persons from the standpoint of biology. Indeed, internal medicine might, perhaps, be defined as "the study of the biology of single persons." One clinician (Brugsch) has adopted "personalism" as a clinical slogan. Certainly no two human beings are precisely alike. We have to think of each person as the resultant of a series of interactions of environmental factors with the germ plasm derived from his two parents (in the fertilized egg-cell or zygote). Biologists speak of the inherited portion as the "genotype" and of the acquired portion as the "paratype," the resultant of the interaction between paratype and genotype being the "realized person" or "phenotype." The complete understanding of any human person, that is to say of any human phenotype, would theoretically necessitate, therefore, a complete knowledge of his genotypic pattern on the one hand and on the other of all the environmental or so-called paratypic factors that have interacted with this genotypic pattern.

These applications of modern biology to the study of man have lead to a pronounced revival of studies of "constitution." Constitutional studies interested older clinicians markedly, though they temporarily suffered eclipse through the brilliant results of the bacteriological and the parasitological researches of the last fifty years. Now, studies of constitution are again coming into their own, and, with them, studies of temperament, of character, and of the things that determine them.

In reading the medical literature in this connection, I would warn you, however, that no

uniformity of terminology has, as yet, been arrived at, and that the terms "constitution," "temperament," "character" and "habitus" are defined in different ways by different writers. Some of the French writers, notably Landonzy and Roger and Laignel-Lavastine, define constitution as the "morphological mode of the individual reactional coefficient"; temperament as the "physiological mode" of the same, and character as the "psychological mode" of the same. Others again reserve the term "constitution" for the genotypic constituents of the organism; whereas still others make the constitution include the whole psycho-physical make-up of any given phenotype at the moment of its study (thus including both genotypic and paratypic factors). Without stopping to discuss the relative merits of these different definitions, I may say that a great deal of interest has recently been aroused in the relationships of the physical constitution (habitus) to temperament and character (physiological and psychological reaction types). In this connection, the book of George Draper on "Human Constitution," (1924), that of Kretschmer on "Physique and Character," (1925), and that of Wertheimer and Hesketh, entitled "The Significance of the Physical Constitution in Mental Disease," (1926), have drawn our attention to varieties of physical constitution and their relation to varieties of character and of temperament on the one hand and to types of mental disease that may develop in persons possessing them on the other. Thus when the physical constitution has the form of the so-called pyknic or apoplectic type, in which the face is round or pentangular and there is a tendency to obesity and to high blood pressure, there is said also to be a tendency to develop the cycloid or extrovert type of personality. In other words, persons of the pyknic habitus are likely to be good mixers, for they look out and not in, they are not shy and sensitive but instead are rather easy-going, getting along well with other people, vibrating as it were in sympathy with their surroundings. In case they should develop mental disease it is frequently of the manic-depressive type.

An opposite type of physique is the so-called asthenic habitus in which the face tends to be oval or elongated, the neck and extremities long and slender, the chest flat, and the abdominal viscera ptosed. Persons of this type tend to be thin rather than stout and are likely to have low blood pressure. Their personalities are often of the schizoid or introvert type rather than of the cycloid or extrovert type, that is to say they tend to be shy and shut in. They do not always get on well with those about them, they are inclined to go their own way independent of others, and, accordingly, are not very good mixers. They may, however, make good students and often develop into distinguished scholars or profound philosophers. Should they develop a psychosis, it is said to be more often of the schizophrenic type than of the manic depressive type.

One must not forget, however, that pure pyknic and pure asthenic types are less often met with than are alloys of the two types, for a person who is predominantly pyknic is often attracted by a person of the other sex who is predominantly asthenic! We might perhaps do well, as Bleuler suggests, in studying mental reaction types not to ask, "Is this person cycloid or is he schizoid?" but rather, "In how far is he cycloid and in how far is he schizoid in tendency?"

Aside from the asthenic and pyknic types of physical constitution there are many bizarre physical types to be observed, especially in persons in whom the organs of internal secretion have been abnormal during the developmental period. These bizarre types are sometimes spoken of as "dysplastic" types of physical constitution.

In how far these attempts to establish relationships between special types of physical constitution and special tendencies in mental reactions will prove to be helpful remains to be seen. The ideas are certainly interesting and worth following up; but we must not forget that the tendency is to lay too much, rather than too little, emphasis upon new conceptions. One should be very cautious and very critical in following the literature in this new field and in making applications of these newer ideas in one's own clinical studies. Certainly the revival of interest in human constitution and in the relationship of constitution to disposition to disease is to be welcomed. I think that there is relatively little danger of our underestimating the influence of exogenous etiological factors. Certainly, up to very recently, we have given too little attention to possible endogenous factors in disease. You will find it interesting, if you have not already attempted it, to see whether or not you can

(*Continued on page 274*)

MECHANICAL AIDS IN ESTIMATING CARDIAC RESERVE*

HERBERT CALDWELL, M.D.,
Lake City.

When a heart functions properly, it maintains a flow of blood sufficient for the needs of all the tissues of the body, at rest or during exercise.

The difference between the amount of work which a given heart does at rest, and the greatest amount of work it is capable of doing under stress is its cardiac reserve.

Breathlessness, cyanosis, cardiac pain and pulsus alternans are signs that the heart has been overtaxed, but it is our endeavor to be able to select the patients who will quickly develop these symptoms without having them actually occur. If these signs appear when the patient is at rest, the reserve force of the heart is approaching zero.

Anatomically, the heart, that engine which drives the body from the cradle to the grave, yields up its secrets, yet its capacity for work under stress seems as difficult to determine as is the long-sought habitat of the soul.

Recently much work has been done along the lines laid down by Henderson and Haggard—in what is known as the gasometric method—estimating the various gases in the blood at rest, and after exertion. Their method seems to open a road to success, but is entirely without the bounds of this paper.

In 1922, Brittingham and White[1] showed most satisfactorily the fallacy of depending on the effect of exercise on blood pressure or pulse in determining cardiac functional capacity.

What, then, is the reason for this paper? It is twofold.

In the last few years, one of the well-known insurance companies of the country has adopted a plan for separating the bad heart risks from the good, especially in those cases not showing definite clinical evidence of heart failure.

The plan involves the use of a machine manufactured by a well-known firm, and which is rather widely advertised as possessing the merit of being able, if properly used, to enable one to estimate the functional capacity of the heart.

The first reason for this paper, then, is to set forth the findings of a number of examinations made with the spirometer and the results compared with other forms of exercise, and the findings of the electrocardiograph.

The second reason is that the writer, in an examination of this subject, having completed about one hundred tests with the spirometer, most of them checked with the electrocardiograph and exercise, has come upon certain reactions of the heart which seem worthy of reiteration at this time.

First. Exercise alone: No one set of exercises has been found that can be said to be all that is necessary, or that equally arouses the heart muscle to action. Schneider's Index, which is frequently quoted, stresses too much the rapid heart. Several patients with quite marked myocarditis were, however, able to satisfactorily pass this test, which is one of those advocated in the selection of aviators.

Although exercise frequently fails to show functional incapacity of the heart, the writer uses a routine set of exercises and increases their scope if any abnormality is detected.

Recumbent: Pulse and blood pressure.

Standing: Pulse and blood pressure.

Twenty-five hops on each foot: Pulse and blood pressure, and in questionable cases: 100 hops with pulse and blood pressure. If the patient undergoes this ordeal with normal reaction, his cardiac function is considered good.

The following points seem worthy of note:

A rise in diastolic pressure of from 10 to 15 m.m. was noted constantly when the patient rose to a standing position from reclining, although the systolic might vary little, if any.

Field and Bock[2] state that in the prone position the blood flow is increased 25% above that in the upright position. This seems to be almost entirely due to the lowered diastolic in the prone position, and gives a very good reason for confinement to bed of patients suffering with a highly diastolic pressure.

A heart that has been accustomed to prolonged exercise (the athlete's heart) frequently does not respond by increased pulse and blood pressure until the exercise is continued long enough to whip it into action—so that the heart, with failing functional reserve and the athlete's heart frequently give the same result after 50 hops; that is, a stationary or falling blood pressure. Increase the number of hops to fatigue, and the athlete's heart jumps to the work—the weakened heart shows increasing failure to meet the demands. A low systolic pressure with a small

*Read before the 54th Annual Meeting of the Florida Medical Association, West Palm Beach, April, 1927.

pulse pressure indicates that the heart itself is weak.

A small pulse pressure is alarming, and one in which this factor increases with exercise is an evidence of failing reserve.

T. F. Cotton says, "The exercise tolerance test is always poor with a considerably enlarged heart. With no enlargement and valvular disease, although the myocardium may be assumed to be not sound, the cardiac reserve may be very little impaired."

ELECTROCARDIOGRAPH

There are certain signs of failing cardiac reserve which the electrocardiograph does show, which are not possible to determine by other means. First: Inverted, or depressed, T waves, except when digitalis is being exhibited, mean myocardial weakness.

Delayed conduction time and prolonged excitation of the ventricles are signs of weakness. Heart block, complete or partial, is shown by this instrument and is a grave symptom. Beyond this there is a great difference of opinion as to the value of the electrocardiograph in estimating cardiac reserve.

F. W. Price[3] states: "It will thus be seen that clinical electrocardiography is the most precise means of investigating the functional efficiency of the myocardium itself."

A. W. Master and H. B. Pardee[4] state: "An abnormal electrocardiogram is indicative of a diseased heart, while a normal electrocardiogram is a sign of a fairly healthy muscle."

Paul D. White has recently stated: "I do not believe that the electrocardiograph can be used to estimate the functional capacity of the heart. Occasionally, with extreme weakness or disease, the complexes may be changed, but sometimes there is almost a normal electrocardiogram shortly before death."

These three opinions differ widely. White is an enthusiast about the electrocardiograph, and yet is willing to acknowledge its failure to detect a failing cardiac reserve.

The polygraph shows remarkably well pulsus alternans, which indicates a failing heart muscle, but this can also be detected while taking the blood pressure by the ausculatory method.

The polygraph also reveals delayed conduction time between the auricles and ventricles, a sign of grave significance.

This brings us to the consideration of the spirometer, a machine which its advocates believe will render possible the separation of the good from the bad risks in "that numerous groups of individuals, apparently in good health, who present, without other signs of diseases, a rapid pulse, irregularity of cardiac rhythm, a murmur of the functional type, a blood pressure higher or lower than usually conceded to be normal for their age and environment; or an unusual cardiac irritability with a rapid and extensive reaction to muscular exertion or psychic influence."[5]

It is also claimed for this instrument that the physician readily becomes expert in its use. That the patient quickly learns its few peculiarities, and the results are remarkably uniform for each phase of the test.

Briefly, the test has nine steps, but it naturally divides itself into two. First: What will the patient's heart do under increased thoracic pressure? Second: What will it do under decreased thoracic pressure?

Under increased pressure the blood pressure should drop, and this it does in the great majority of cases.

Under lessened pressure the blood pressure should rise, but this, in the writer's opinion, it does not do with sufficient uniformity to render the test of great value.

The advocates of this method claim that tests six, seven and eight are the vitally important ones. In this blowing test the blood pressure should rise from 20 to 50 m.m., and between these limits a rise is considered normal. They claim in a thousand cases such a uniformity of response that on the result of this test alone it can be decided which cases should be allowed insurance and which should not.

The writer's results were so varied that he finally selected five robust individuals of his acquaintance, athletically inclined and apparently normal, as a check, against the number of admitted cardiac cases—upon whom the test was being made.

Of these five only one gave the normal reaction expected on the first trial. When the trial was repeated, one more of the five was able to come within the normal limits.

This left three of these apparently healthy, strong individuals in the same class as patients with marked myocardial weakness. Yet, when these three men were subjected to prolonged exercise, their hearts responded with increased

blood pressure varying from 30 to 50 millimeters of mercury.

Among the cardiac patients examined, both functional and organic, the greatest number responded with a very slight increase of blood pressure, which would place them among the hypo-active group, or those of evident myocardial weakness.

A few had a very great response to the respiratory exercise, and a number of others, whose blood pressure seemed to be held down during the process of blowing into the spirometer, had a very great rise of blood pressure immediately upon inspiration.

This latter reaction, I believe, can be likened to the delayed rise spoken of by Brittingham and White, and is evidently a sign of cardiac fatigue approaching the limits of endurance.

Two cases during the test had a blood pressure approximating 210 cystolic, and the last two steps were omitted.

One patient's blood pressure, during the test, fell about 20 points, and this, with a very small pulse pressure, around ten and a slowing pulse, was considered sufficient reason for stopping the test. The patient's color remained good, but when asked later what his sensations were, he described a feeling of faintness and pain in the region of the heart.

In spite of a normal electrocardiograph, this last patient's test is considered the most conclusive made of a lessened cardiac reserve, and shows that the findings of the machine are, at times, very valuable. But the writer's conclusions in regard to the spirometer are:

First: That it is more difficult of manipulation, as regards the operator and the patient, than has been stated.

Second: That the results obtained are open to the same criticism as other exercise or cardio-respiratory tests, and that it does not supply a just basis upon which to grant or withhold insurance or compensation, and unless considered with a number of other facts, could scarcely be the deciding factor as to the amount of work a given heart was capable of doing.

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TREATMENT OF HEART DISEASE*

MEREDITH MALLORY, M.D.,
Orlando.

In taking up the treatment of heart disease, one cannot help but call attention to the prevalence of this condition, for the death rate from cardiac disturbances so far exceeds all others that the medical profession should take greater cognizance of the disorder and bend all efforts toward lowering the rate. There is no question but the problem is a great one, but there is also considerable doubt as to whether or not all death certificates giving the cause as heart disease are honestly, or, I might say, intelligently, filled out. Increase in the registration area gives a large list of cases that have never been accurately worked out, and the law compels the physician to make some diagnosis. When death does not occur until the heart action stops it is all too easy to say "Chronic Myocarditis", when the real causes are obscure. Again, some of our surgical colleagues seem reticent to admit that in many instances death may be the result of any surgical procedure, and the responsibility is placed upon the heart.

Reviewing statistics, while tiresome, is the only concrete evidence that can be produced to properly convey the seriousness of the problem confronting us; in 1924, 176,871 died from heart disease, while in 1925, 191,226. Beginning in 1911, and including 1925, the following is the ratio per 100,000:

1911 — 141.1	1919 — 131.0
1912 — 142.8	1920 — 141.9
1913 — 138.9	1921 — 140.9
1914 — 142.2	1922 — 148.4
1915 — 147.6	1923 — 157.3
1916 — 150.6	1924 — 178.4
1917 — 153.8	1925 — 185.5
1918 — 153.3	

Roughly, approximately two per cent of the population are suffering from definite organic heart disease. Taking these figures and the population of the country as 100,000,000, it will be seen that the expectancy of life from heart disease is about ten years. Therefore, such an organization as the Association for the Prevention and Relief of Heart Disease, which was started shortly before the World War, is most

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necessary and should have the cooperation of every physician, so that benefit may be afforded those suffering from cardiac disorders, and the study of prevention may be encouraged.

Dr. Haven Emerson, in the analysis of 927 cases, showed the following etiologic distribution:

Acute rheumatic fever	331 or 35.8%
Acute tonsillitis	207 or 22.3%
Syphilis	122 or 13.1%
Scarlet fever	78 or 8.4%
Diphtheria	47 or 5.07%
Pertussis	14 or 1.5%
Measles	54 or 5.8%
Carious teeth	63 or 6.8%
Chorea	11 or 1.1%

Here nearly two-thirds of the cases show a rheumatic infection or a focus of infection which, to our best knowledge, is the forerunner of acute rheumatic fever. These figures indicate, in my estimation, very nearly the correct etiology of heart disease. While many cases of clinical chronic myocarditis show no pathological lesion at autopsy, as shown by Cabot, it is not unreasonable to surmise that rheumatic infections may weaken the neuro-muscular conduction without showing evidences of inflammation or degeneration. My personal opinion is that the figures in the future, showing the etiology of cardiac disease, will show even a still greater preponderance toward the rheumatic infections.

With this in mind, it is quite evident that the treatment of heart disease resolves itself immediately into one of prevention. The quack, charlatan, would be medical cults. Christian Scientists, etc., are exerting such a great influence on the public that when these pseudo scientists advise against the removal of foci of infection in children, the fond mother is all too willing a listener; also, the laryngologist is inclined to be too conservative, and many infected tonsils are allowed to remain. Any tonsil that remains inflamed, or around which is constantly a low grade inflammatory area, should be removed, whether or not pus can be squeezed from the crypts. Sinuses have not received proper attention, and the teeth of children have been neglected. It is these foci occurring before the age of puberty that must be eradicated at the first sign of trouble if heart disease is to be prevented later. Now that prevention of some of the acute infectious diseases is possible, it is not at all unlikely that many of the organisms belonging to the rheumatic infection group will become even more predominant. When the adult age is reached, there are other sources of infection which must be added to the foregoing, such as the appendix, gall-bladder, sluggish bowels, especially associated with hemorrhoids, torn cervices, ingrowing toe nails, urinary tract, prostate gland, etc. It is not only necessary to rule each and every one out as a cause, but it is imperative to remove, if possible, each one around which there is a shadow of a doubt as to whether or not it is one of the causes of a beginning cardiac disorder. Heart disease should have no conservative or palliative treatment in its incipiency.

The failing heart, regardless of its cause, is the condition that the general practitioner is most frequently called upon to treat. Patients with failing hearts should be put immediately to rest. Rest not only in regard to physical activity, but also to mental uneasiness, for, above all, it must be a comfortable rest. Practically all of these people are restless in the supine position. Many have arrived at the conclusion that lying in bed increases their discomfort, and that they are easier in an upright position. However, they should be put to bed with some sort of bed-rest, arranged in such a manner that they are comfortable; the degree of inclination can be measured only in regard to the ease of the individual. In some cases it is necessary to provide a stand or table in front so that a forward leaning position may be obtained. The bed itself should be a narrow one, with springs and mattresses that do not sag. The restlessness due to the anxiety of the mind and to labored breathing must be relieved at once by some form of sedative. The milder the drug the better it is for the patient, but omission of this will delay the response to treatment, if not be a source of fatal termination. Bromides and chloral afford the best and easiest relief in the majority of cases, but many will need, for a few days at least, small doses of codeine or morphine. Other drugs that may be tried are barbital, luminal, sulphonal, trional, etc. Rest is the first and most important phase of the treatment of heart disease, although many physicians do not realize its importance.

Digitalis, or fox glove, is the principal drug used in failing hearts. Its action is really one of rest, which is produced by lessening the conduction in the bundle of His through stimulation

of the vagus and direct action on the bundle. Whether or not the contractile power of the ventricular fibres is increased is a debatable question. The form in which digitalis is used makes but little difference. Personally, I feel that the simpler the preparation the better it is for the patient, especially economically, and confine my use to the powdered leaves and to the tincture; also, mouth administration is the method of choice, although, in cases of special emergency, some forms may be given intravenously. In regard to dosage, there are two schools, those who believe in the large doses and rapid digitalization, and those who favor the small dose. The amount of the large dose is figured by the Eggleston Method:

$$\frac{\text{C. U.} \times 0.15 \times \text{W}}{1000} = \text{grams powdered leaf in total daily amount.}$$

$$\frac{\text{C. U.} \times 0.15 \times \text{W}}{100} = \text{cubic centimetres of the tincture in total daily amount.}$$

$$\frac{\text{C. U.}}{100} \times \text{wt.} = \text{cubic centimetres of infusion in total daily amount.}$$

The cat unit was figured by Hatcher as the weight of the dried drug, in milligrams, that is required to kill a cat, one kilogram in weight when solution is injected intravenously. For the average person (150 pounds) the preceding formulas work out to 2.25 grams (34 grains) of powdered leaf, 22.5 cubic centimetres (5½ drams) of the tincture, and 150 cubic centimetres (5 ounces) of the infusion. About one-half of the dose is given at first, followed in six hours by one-fourth, and in another six hours by one-eighth to one-sixth. After this, about one-tenth is given every six hours. My own method is to give one and one-half drams of the tincture every four hours for four doses for three days, then cut in half for three days, and then one-half again for usage until thoroughly digitalized. The large dose method must not be used in patients having had digitalis within ten days. The small dose method gives one-eight to one-fourth gram (II gr.-IV gr.) of the powdered leaf or 1.25-2.5 cubic centimetres (MXX-MXL) of the tincture every four hours for four doses a day until digitalized. Objection to this method is that, first, the small doses seem more inclined to produce vomiting before complete digitalization, and, second, in case the drug is not up to standard, the length of time required to get the desired action is too long.

In cases of emergency, digitalis may be given intramuscularly or intravenously. Intramuscular injection may prove very irritating by producing a local reaction in the tissue. One to two cubic centimetres of the tincture, well diluted, may be given safely intravenously.

Continuation of the drug after the patient has become active is necessary in many cases, from the economic standpoint. Large doses should never be used; in fact, rapid digitalization should never be done in ambulatory cases. The dosage for people required to be at work should be just large enough to keep the pulse rate between seventy-five and eighty a minute.

Other drugs that are used which have action similar to digitalis are ouabain, squills, apocynum, hellebore, strophanthus and convallarin. Their use is not advised, although some advocate them. Strophanthus is probably the most recognized of the group and is given in following dosages: Tincture of strophanthus, eight to ten minims, and crystallin strophanthin, 1/150 gr., intravenously. It is used for intravenous therapy and in those cases in which digitalis produces toxic effects.

There are a number of drugs that are used in emergencies. While, scientifically, they have no action on the heart muscle, still they have their advocates and when one sees results following their administration there is considerable hesitancy in following the advice of those working in the laboratories, especially when there is no harm that can be done. Among the most commonly used are camphor, caffeine, theobromine, strychnine, adrenalin, ammonia, alcohol and the nitrites. Caffeine does slow the heart at times and its diuretic action is valuable. It is given in two to five grain doses intramuscularly. Theobromine is a diuretic and is given in five to fifteen grain doses over a limited period of time. Strychnine acts on the nervous system and probably owes its value to the fact that it tones up the body generally. Adrenalin produces vaso-constriction, but has no direct action on heart muscle; ammonia and alcohol at least produce a feeling of warmth and well-being which helps to relieve the apprehensiveness of the patient. The nitrites have no use except in angina. Camphor seemingly stimulates the heart. Whether this has any scientific basis or

not, I have seen rapidly failing hearts show improvement after its administration.

The diet should be varied to meet the individual case. There is no general rule that can be laid down. In many cases the Karell diet which consists of four glasses of milk or about eight hundred cubic centimetres in twenty-four hours is preferable. In others, dry food seems to be the best. In obese patients it is the lack of diet that is the most essential. If the patient is given a light, nutritious diet, sufficient to preserve bodily strength while at rest and which contains no irritating or indigestible foods, the situation in most cases has been met. In certain hypertensive heart disturbances and nephritis the reduction of salt intake may be recommended and in cases where there is pronounced edema the curtailing of fluid may be advisable. Bowel activity should be sufficient to carry off any excess fluid and still not active enough to interfere with the comfort and rest of the patient.

Therapeutic baths have no special effect on heart muscle but will, when given below body temperature, produce vaso-constriction, thus causing a secondary slowing action of the heart.

Having taken care of the failing muscle, attention must be then given to the etiological factor that produced the failure. As previously stated, if rheumatic in origin, foci of infection must be eradicated. Syphilitic heart disease should be treated intensively with anti-syphilitic measures. Arsenicals, such as arsphenamine, neo-arsphenamine, and sulph-arsphenamine are indicated, but their action should be watched carefully for at times they have a deleterious action on the vascular system. Mercury given preferably by inunction and bismuth intramuscularly should be used. Potassium iodide by mouth is best administered in moderate doses, twenty to sixty grains a day. The treatment of hypertensive heart disease is based indirectly on the cause of the hypertension, which in many cases is obscure. Proper elimination, reduction of salt intake, dietary treatment of nephritis and diabetes, if either is present, is indicated. The use of nitrites is most discouraging and administration of hepatic extract has not proven beneficial except temporarily. Lately I have been giving small doses of calcium iodide and benzyl benzoate, with some result, which is probably due to instructions to the patient as to the mode of living. Diphtheritic heart disease must be prevented by the early use of anti-toxin. Valvular heart disease is of importance only as valve changes produce an extra burden on the heart muscle and increases its work. No medication can improve a damaged heart valve.

The future course of a patient recovering from an attack of decompensation should be clearly outlined, especially as to exercise. The heart muscle, like skeletal muscle, must have a certain amount of work to keep up its general tone, but this amount varies with each individual case; when any exercise produces a feeling of beginning exhaustion or dyspnœa, too much has been undertaken. No exercise that is sudden, violent or competitive should be attempted.

Acute or subacute endocarditis is practically always the result of a rheumatic infection. Vaccines and serums have been tried with varying successes and it may be that Prof. Small's new organism will give us a specific for the disease. Salicylates have been of no value. Neutral acriflavine, mercurochrome and gentian violet intravenously have been used recently, and while there seems to be some justification for their trial, still they have not been sufficiently used to be able to publish enough statistics as to their value. Cacodylate of sodium intravenously has up to the present time given the best results. Transfusions aid only as the general condition of the patient is improved, especially as there is usually present an anemia.

Pericarditis is usually preceded by an attack of rheumatic fever and the treatment should be instituted along these lines. Salicylates in large doses will help in a limited number of cases. An ice bag to the prærcordia is of more value than any remedy, especially so when pain is present. If the heart muscle shows signs of weakening, digitalis should be administered. In those cases in which there is a large amount of fluid that persists and embarrasses the heart, parancentesis should be done. The amount of fluid to be withdrawn varies with the character of the fluid and the size of the effusion. In cases where there is only a moderate amount, a syringe full withdrawn may stimulate the absorption of the rest. There are several sites suitable for the operation and the choice lies with the operator; the two used most generally are, first, a point midway between the maximum apex beat and the left border of the cardiac dullness in the fifth interspace; if the apex beat can not be determined, measure in about an inch from the left border; second, the angle formed by the ensi-

form cartilage and the left costal margin. In adhesive pericarditis it has been found that portions of the ribs, usually the third, fourth or fifth, may be removed when the adhesions are producing retraction of the chest wall. Diuretics, cathartics and diaphoretics tend only to weaken an already weakened heart muscle.

The treatment of angina pectoris is divided into two phases. During the attack the use of nitrites is indicated: either the inhalation from amyl nitrite pearls or the administration of nitroglycerine, in 1/100 grain doses. During severe attacks the use of morphine is strongly recommended. In the interval the patient must avoid those things that are liable to provoke an attack; also, search should be made for an etiological factor. Exertion, constipation, worry, excitement, gastric distress, irregular living, excesses in food, drink and tobacco should all be avoided. A search should be made for foci of infection and anti-syphilitic treatment is often beneficial. Surgical treatment is in the trial stage.

As the diagnosis of the different arrhythmias depends largely on some of the instruments of precision, it is useless here to go into detail as to their treatment. Paroxysmal tachycardia may be aborted at times by stimulation of the vagus, either through direct pressure at the level of the cricoid cartilage or by pressure on the eyeball. Ice bag to the præcordia often stops the attack, or the drinking of ice water. Digitalis is used in some cases. Auricular flutter and fibrillation are indicative of the use of digitalis to the point of heart block. Quinindine has been used successfully in fibrillation, but there is a question whether or not it is more efficacious than digitalis. Treatment of heart block is very unsatisfactory. Search for the underlying causes, such as syphilis or arterio-sclerosis, must be made. Drug therapy is very discouraging and no one drug will do for all cases; among those to be tried are atropin, adrenalin, ammonia, nitrites, camphor and caffeine. Pulsus alternans is indicative of myocardial weakening and should be treated as such.

Briefly, in conclusion, allow me to urge upon you that the eradication of heart disease lies not in the curing of the disease but in the recognition and prevention of the causes; the greater percentage of which are of rheumatic origin.

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Joint discussion opened by

Dr. T. Z. Cason, Jacksonville:

Just a few points with reference to Dr. Caldwell's paper: I have used the apparatus referred to for about eighteen months. The first point I want to make is that if any of you contemplate the use of this spirometer, you will probably find true some of the things Dr. Caldwell has said. But in the first place, it is going to take you months before you reach the point where it will mean anything to you, even though you use it frequently. The variations are numerous and in spite of the fact of the claims of the manufacturer and those who have used it, it does not always pan out just as you would expect. That is the first point.

The next one is that while it is of considerable value and should be used if you are doing much heart work, I believe its greatest value is in the sick room and the hospital and in cases where the patient is unable to take any exercise whatever. It is a safe apparatus. The experiment or test may be made without any danger to the patient and for the really sick person, in the hospital, for instance, it will give real benefit, but, as I stated, before you get any real benefit whatever, it will have to be used over a considerable period of time.

Dr. Julian E. Gammon, Jacksonville:

I should like to say a word about heart reserve since I have been interested in the subject and read a paper on heart reserve before the last meeting. I tried to demonstrate that heart reserve could not be estimated mechanically in normal or pathological hearts. In pathological hearts you may have evidence of disease handicapping the heart, but the degree of handicap of the heart reserve can best be determined by observing the heart perform within the patient's sphere of activity, and the patient's ability to increase

his heart reserve by retraining without symptoms of heart failure. The pulse rate and blood pressure readings are too variable and greatly influenced by emotion to be of any value in determining the heart reserve and there is no mechanical apparatus which has been devised as yet that will give us this information. I am afraid clinical medicine is not receiving the attention it should, and that there is a tendency for laboratory and mechanical diagnosis to supplant clinical observations.

Dr. W. C. Blake, Tampa:

I should like to mention one point in connection with the paper of Dr. Meredith Mallory. He mentions in the treatment of cardiac edema, salt-free diet, limitation of fluids and the giving of an adequate amount of digitalis. These things, of course, are of prime importance. However, if in addition, ammonium chloride and novasural are given the edema may be mobilized in about one-half the time. Patients respond to this treatment usually even where other methods have failed. Ten grams of ammonium chloride is given daily and an ampoule of novasural intravenously every second to fourth day. The diuretic effect of novasural lasts from twenty-four to forty-eight hours or even longer, so that the interval between injections should be gauged by the duration of the effect. Nephritic edema also responds to this treatment and even with anasarca from biliary cirrhosis much of the fluid can be eliminated.

Dr. J. G. DuPuis, Miami:

I wish to emphasize one point Dr. Mallory brought out in his paper, and that is the point of the treatment of rest, not only with reference to this particular condition, but I would like to emphasize that in the many infectious and pathologic conditions with which we meet, particularly in heart conditions, there are more important things than mere rest in bed. You take the active business person, man or woman, tied up in business affairs, some conditions should be brought about to rest the mental condition of the patient who is overwrought and overanxious over many things, and if not lying in bed will probably aggravate the condition more than really give the patient rest. This is particularly true of this mechanical age. I think since the age of the automobile, we have an increased percentage of cardiovascular diseases. The automobile, although in all its realm of pleasure and usefulness, has brought about great conveniences, at the same time it has brought about the rapid development of more cases of cardiac disease. Therefore, gentlemen, I particularly wish to stress on this occasion and emphasize the treatment Dr. Mallory has suggested in his paper, of rest.

CONCLUSION

Dr. Herbert Caldwell, Lake City:

I sent Dr. Erwin of Jacksonville a copy of my paper and received from him this letter in which he says:

"I quite agree with your conclusions. The paper covers the situation thoroughly."

Also in a letter received from Dr. Paul White, of Boston, he says:

"The spirometer is also of little value except in well marked heart failure. It is of no value in differentiating slight heart disease from other conditions."

Like Dr. Cason, I had hoped when I started to work with the spirometer that it would be an instrument I could take to the bedside and tell whether that patient had sufficient cardiac reserve to go through some anticipated strain. So far I have not found the results would justify relying on this instrument.

With Dr. Gammon, I agree that if you can estimate what the patient can do without signs of distress, that is probably the best way to estimate cardiac reserve.

CONCLUSION

Dr. Meredith Mallory, Orlando:

I thank Dr. Blake for bringing out the use of novasural, with which I have had very little experience.

On the subject of rest, I would like to add that be sure you do not make a neurotic out of your patient by giving him too much rest.

CONGENITAL HYPERTROPHIC PYLORIC STENOSIS*

EDWARD JELKS, M.D., F.A.C.S.,
Jacksonville.

When vomiting, visible peristalsis, abdominal tumor, and constipation occur in the adult one hardly doubts that the patient has a mechanical obstruction of the bowel. When these conditions are noted in the infant, however, we are prone to consider the presence of a mechanical obstruction only after dismissing from our minds the

*Read before the Riverside Hospital Staff February 21, 1927.

other less likely possibilities. In the adult, we do not hesitate to make a diagnosis of obstruction even though a tumor may not be palpated. Surely, it must be that signs as fundamental as vomiting, visible peristalsis, and stoppage of the bowels indicate similar pathological processes regardless of the age of the individual. The same careful history and physical examination of the infant that one makes of the adult would indicate pathology which is recognized readily in the grown-up.

With these facts in mind let us discuss a type of actual obstruction in infants, namely, congenital hypertrophic pyloric stenosis. Its pathology is a localized hypertrophy of the muscles of the stomach wall in the pylorus. The muscles chiefly involved are the circular ones. At operation there is seen a firm constricting section of tissue almost cartilaginous in hardness. On section this is found to involve a small part of the terminal stomach wall and to extend down through the pyloric ring, protruding into the duodenum very much in the shape of the uterine cervix. It is important to bear in mind this last point, since in cutting through the hypertrophied tissue at operation it is easy to niche the part of the duodenum which lies over the lower end of the tumor. I did this once without any serious results, but there are reports of peritonitis resulting from such an accident.

Etiologically the condition possibly results from an improper functioning of the autonomic nervous system which causes a permanent spasm of the muscles of the pyloric stomach wall. There is a theory, however, that it is a hypertrophy of hyperfunction.

May I recall the following case to illustrate the usual clinical story and some points in the handling of this condition:

About one year ago Baby D., male, came under our care because of vomiting, loss of weight and constipation. At birth, four months previously, he appeared normal in every way. He weighed seven and one-half pounds. At the age of four weeks he began to vomit at irregular intervals. After one week, vomiting occurred following each nursing and became explosive in character. The child had been taking regular three-hour feedings of breast milk only. The mother said that at this time "she did not see waves in the stomach, but did see two lumps in the stomach which did not move but would come and go." Four days of treatment with thick food and atropine gave some relief from the vomiting, but since this onset of the severe type at the age of five weeks, the vomiting has never stopped completely. The longest period of its cessation has been five days. Two times in the past five weeks there have been so-called "spells of vomiting", at which time the bowels did not move even with enemata. At the beginning of the present attack, four days ago, Dr. Shaw, after a barium meal gastro-intestinal study, reported a normal patulous pylorus with a normal stomach, duodenum and small bowel. Nevertheless, the patient continued to vomit milk and water, to lose weight, and the bowels did not move for the four days between this X-ray examination and his admission to the hospital.

On examination, the baby appeared in a languid stuporous state. His temperature was 102 degrees per rectum, and pulse weak and rapid. He was decidedly emaciated, with dry, loose skin. His weight was eight and one-half pounds. The abdomen was distended, especially above the umbilicus. Beginning along the costal border, there could be seen, especially after taking food, a deep peristaltic wave pass across the epigastrium and disappear just to the right of the midline. Sometimes it remained still, giving the appearance of two lumps, which the mother had described. On the first examination it was not possible to make out a tumor. Later, however, a hard, movable tumor could be felt in the right epigastrium about three-fourths of an inch in diameter. This was especially apparent when the patient was given liquids. On account of the age of the patient, four months; the rather late onset of vomiting at four weeks of age; and X-ray findings which indicate the absence of a mechanical obstruction, we might have had difficulty in arriving at a definite diagnosis had we not relied upon the fact vomiting, visible peristalsis, constipation and tumor mean obstruction. Because of the patient's high temperature and poor physical condition, we gave salt solution hypodermically. Atropine was given empirically. The following morning his temperature was normal, but the vomiting continued. On the fourth day after admission, we operated and found the typical picture of congenital hypertrophic stenosis. The technique followed was that of Fredet-Remstedt. When the hypertrophied area was incised, the mucous membrane straightway unfolded, making a normal size lumen. A tag of omentum was attached over

the gapping opening through the stomach wall. The patient was given liquids in small quantities beginning two hours after the operation. His convalescence was steady and uneventful. There has been no vomiting since the day of the operation.

Besides demonstrating the cardinal characteristics of congenital pyloric stenosis, this case brings up three points which I wish to consider in more detail:

1. The first is the question of therapy. Many pediatricians insist that this trouble can be cured medically. There are just as ardent exponents for surgical treatment in all but the mild cases. It is not my desire, nor have I the experience to try, to settle this question. The first thing to do is to recognize the presence of the stenosis. In our case, medical treatment, consisting of diet and atropine given over long periods, had not given relief.

2. The second point which impresses us is the finding of an exception to the rule that unqualified reliance can be put upon X-ray studies in making a diagnosis. Almost everyone agrees that in true stenosis there is unmistakable, though not necessarily complete, retention in the stomach of at least fifty per cent or more of the barium meal at the end of four hours. The contrary was true in this case. The barium passed through the stomach. Still the patient continued to vomit, although physiologic doses of atropine were given.

3. The third and most important point this case brings out is the value of pre-operative care. These babies, by the time they reach the hands of the surgeon, are usually very toxic. The prolonged vomiting and lack of nourishment have resulted in thorough dessication of the tissues with chemical changes of acidosis. They are extremely weak. There are practically always present one or more degrees of fever. We had one case with temperature 104.5 degrees upon admission. Under the administration of fluids, glucose and alkalies hypodermically or intravenously, the chemical picture changed completely and the temperature returned to normal. Since there is no need for undue haste, everything should be done to strengthen the patient before operation. It is the lack of this careful preparation that constitutes one of the chief elements in surgical mortality.

Our interest in congenital hypertrophic pyloric stenosis was aroused acutely last year by the unusual occurrence to us of two patients being admitted to the hospital on successive days with this condition. About six weeks later we had another admission. The three were operated upon with complete recovery.

Dr. Stewart G. Thompson, of the State Board of Health, has favored us with some interesting figures. During 1925 there were in Florida 29,301 births. Of this number, 634 died between the ages of two weeks and five months. Six had the diagnosis of congenital hypertrophic stenosis; 66 died with such indefinite diagnosis as gastro-intestinal disease, stomach trouble, convulsions, malnutrition, etc. With a medical and surgical mortality of ten per cent in cases of possible congenital pyloric stenosis, which is two to four times as much as it should be in the average handling of cases, there probably were one or two hundred cases of this condition in our State last year. Or, interpreted another way, our mortality must be much greater than the average.

It is to be hoped that we physicians in Florida are not overlooking this intensely interesting and serious condition. Scott gives, in the Medical Journal and Record, 1925, two helpful rules in caring for sick infants.

He writes: "First, do not wean the baby because it is vomiting its mother's milk, but strip it and examine the abdomen. Palpate for a tumor at the pyloris." Secondly, "do not physic the patient for constipation, especially when vomiting, until you have examined the naked abdomen."

May I not add: In the presence of vomiting, visible peristalsis and constipation in infants, think first of obstruction of the intestinal tract.

IMPORTANT

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DR. JOSEPH YATES PORTER

Doctor Joseph Yates Porter was born in Key West, Florida, October twenty-first, 1847, son of Joseph Yates Porter and Mary A. (Randolph) Porter. Doctor Porter obtained his preliminary education in the schools of Burlington, N. J., and then entered Jefferson Medical College in Philadelphia, from which he graduated in 1870. During the same year he was appointed Acting Assistant Surgeon in the United States Army and sent to Fort Jefferson, where he spent three and a half years and passed through an epidemic of yellow fever. He had yellow fever himself in 1867 and won a great reputation in the treatment of several later epidemics. In 1875 he was appointed Assistant Surgeon in the army and five years later was promoted to the rank of Captain. He remained in the army for nineteen years, until 1889, serving at Tortugas, Key West, Tampa, Miami, and in Texas. In 1887 he was in charge of the yellow fever epidemic as Chairman of the Monroe County Board of Health at Key West and in control of Government relief at Tampa.

Upon his retirement from the army in 1889 he was made State Health Officer of Florida, serving in that capacity for twenty-eight years, to 1917. He probably had more experience in the management of yellow fever epidemics than any other man of his day, and was recognized as an expert diagnostician in that disease. Due mainly to preventive measures inaugurated and carried out by him yellow fever was banished from Florida, so that people seek our State because of its freedom from disease rather than shun us because of recurrent yellow fever epidemics.

Doctor Porter was a member of the American Medical, Southern Medical, Pan-American and Florida Medical Associations—an ex-president of the latter; a member of the American Public Health Association, Monroe County Medical Society, and Association of Military Surgeons of the United States, and many other scientific health associations.

He took an active part in all movements relating to the health of our people and was an ardent advocate of organized medicine, although his participation in public welfare work prevented him from devoting any time to active practice.

In 1900 he was elected a representative from Monroe County and served his term in the Florida Legislature.

Doctor Porter was married in 1870 to Louisa Curry, who, with three children, William Randolph Porter, Mrs. Mary Louise Harris and Dr. Joseph Yates Porter, Jr., survive him. Doctor Porter died on March 16, 1927. He will be remembered as the State's greatest sanitarian.

Most men after reaching the age of seventy rest on their oars, but Doctor Porter's active service almost to the day of his death was remarked by all who knew him. He served during his late years as City Health Officer, District Health Officer, and President of the Chamber of Commerce of his native city without remuneration. The probability that he would soon reach the point where active participation in civic affairs must cease gave him much concern and distress.

Doctor Porter desired to serve his fellow men to the last day of his existence, and no greater tribute can be paid to the memory of any man than to say: "He lived to serve mankind."

WM. R. WARREN, M.D., Key West,
Necrologist.

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JOSEPH YATES PORTER

In the passing of Dr. Joseph Yates Porter, Florida suffers an irreparable loss. Dr. Porter was born in Key West, October 21, 1847. He graduated from the Jefferson Medical College in 1870, and during the same year was appointed acting assistant surgeon of the United States Public Health Service, in which capacity he served three and one-half years, being stationed at Fort Jefferson, Dry Tortugas Island, off the coast of Florida.

In 1875 he entered the United States Army and served a number of years on the Mexican border, where he was associated with Dr. William Crawford Gorgas. During the epidemic of yellow fever in 1887 and 1888, he rendered invaluable service, having charge of the Government relief measures. His service during this time was accorded national recognition.

In 1889, when the State Board of Health was created by the Florida Legislature, Dr. Porter assumed the position of state health officer and secretary of the Board. In this capacity he served uninterruptedly, with efficiency and merit, until 1917, a period of twenty-eight years. Throughout this period, Florida was the prey of numerous epidemics, and Dr. Porter proved his outstanding worth as an epidemiologist and sanitarian. He was an authority on sanitation and epidemic diseases and was among the first to accept the mosquito theory of the transmission of yellow fever. He was a pioneer in preventive medicine, and his merited achievements, rendering living conditions better in the state, is now history. As long as there is a Florida, his memory will be cherished.

MEDICAL EXAMINERS GET RESULTS

The excellent work of the Florida Board of Medical Examiners in apprehending and prosecuting "diploma mill" operators is to be commended most heartily by the Journal. During the past year, the fruits of their efforts have been realized. National recognition of their work has been acknowledged in many ways. It is particularly interesting to note that in the March issue of the Federation Bulletin, published by the Federation of State Medical Boards of the United States, the following brief of their work is recorded:

"Almost ten years of effort of the old 'regular' board and the present composite board of medical examiners to eliminate illegal and fraudulent practitioners of medicine, have resulted in the arrest and indictment of a number of persons who will be tried in Tampa during the term of court which starts March 14. The voluminous data which the boards collected were laid before a federal grand jury; indictments were returned in some cases on charges of using the mails to defraud, or of having practiced medicine with diplomas and licenses obtained illegally, or of having illegally issued diplomas and licenses.

"The secretary of the present board of examiners, Dr. William M. Rowlett, believes that this investigation will prove to be more startling than the Connecticut diploma mill investigation, and that it may reach all sections of the country. A batch of licenses for the old Florida Eclectic Board of Medical Examiners was made by a lithographing house in Birmingham, Ala., in 1919, of which some officers of the board at that time have denied knowledge. The old 'regular' board of examiners went out of existence in 1920, yet a Birmingham printing house ordered fifty copies of licenses of this board from a Jacksonville company in 1922, and the order was delivered. The Tampa Tribune stated that, in many towns in Florida, 'doctors' without medical training, licensed through fraud and trickery, were ministering to the sick. It is this situation which the present State Board hopes will be cleared up by this investigation. Among those who have been indicted, or are being sought by federal authorities, are said to be:

Dr. George A. Munch, Tampa, formerly secretary of the old board of eclectic medical examiners.

"Dr." Charles C. Faiman, formerly of Chicago.

John J. Heitz, Orlando.

Paul C. Ronning, Lake Worth.

William H. H. Sharpe, St. Petersburg.

Joseph M. deGaetani, formerly of Jacksonville.

Lloyd B. Riley, St. Petersburg.

Dr. Samuel McCubbin, Kansas City, Mo.

"Dr." Benedict Lust, New York, naturopath and publisher of Nature's Path.

William A. Lucia, Brooklyn.

Francisco P. Trapani, New York City.

Francis T. Shyne, Washington, D. C.

Charles Wade Page, Chipley.

Edward J. Roach, formerly of Ormond.

Henry D. Sbordi, St. Petersburg."

WORKMEN'S COMPENSATION BILL

It is understood that there probably will be introduced during the present session of the Legislature a workmen's compensation bill. In some states, where laws have been enacted, the medical profession has not been awake to the importance of the medical phases of the law. After these laws are made, it is almost impossible to procure any change. The members of the medical profession of our state should be on the alert if such a bill is introduced and analyze carefully the workings of the bill. In a communication from Dr. Wm. C. Woodward, executive secre-

tary of the Bureau of Legal Medicine and Legislation of the American Medical Association, he makes the following statement:

"The underlying principle of all such legislation is that injuries to workmen are necessarily incident to the industry; that workmen should not lose by reason of such injuries, but that the costs should be borne by the industry itself in the first instance and then passed along to the consuming public as a part of the cost of the product. The public that buys the goods pays the manufacturer a price that enables him to reimburse the workman for the loss sustained by reason of the injury.

"That principle is probably perfectly sound. Unfortunately, however, the proponents of such legislation generally seek to compel the medical profession to bear a large part of the cost of the injuries by putting the profession in a position where it is supposedly required to render service to injured workmen at prices far below those charged to the community generally. This, of course, should not be.

"Another important matter to be considered is whether the employer or the employee shall have the right to choose the physician in any particular case. There is a strong tendency on the part of employing interests to demand the right to impose on the injured employee physicians of the employers' choice. The working man is put in the position of an infant, incapable of determining what is and what is not good for him, when it comes to medical treatment."

ON THE RELATION OF THE FUNCTIONS OF THE GLANDS OF INTERNAL SECRETION TO THE THINKING, THE FEELING, AND THE STRIVING OF MAN.

(*Continued from page 260*)

establish any correlation between special types of physical structure and special mental reaction types in your own patients. It is not uninteresting, too, aside from medical practice, to test out these new conceptions with regard to persons whom one knows familiarly, observing in how far temperamental and characterological features are, in reality, correlated with the types of physical structure to which they have in these newer studies been attributed.

In conclusion, I shall throw upon the screen a series of lantern slides illustrative of some of the principle endocrine syndromes on the one hand and of some of the principle psychiatric syndromes on the other. I shall also show a few slides illustrative of the main types of physical constitution. If my paper and these lantern slides shall have increased your interest in the subjects dealt with I shall be very glad.

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STATE NEWS ITEMS

Though the Fifty-Fourth Annual Convention of the Florida State Medical Association at West Palm Beach has passed into history, echoes of its success and of the delightful entertainments planned by the Palm Beach Medical Society and their wives are still being heard throughout the state. For, despite the depression caused by bank failures and the bursting of the real estate boom, West Palm Beach provided for the visiting physicians, their wives, mothers and daughters a three-day program of entertainment conceded one of the finest in the history of the state conventions. No effort was spared to give the visitors as much as possible of the vividly delightful winter life that has made the Palm Beaches renowned among the playgrounds of two continents.

Outstanding among the events planned for the feminine visitors was the luncheon at the Breakers, Palm Beach's new $7,000,000 hotel, opened last Christmas. With several hundred guests in their loveliest frocks and hats, the great dining room of the Breakers, with its vistas of sapphire ocean from every window, was like nothing so much as a huge flower garden, and with a talk from Dr. H. Mason Smith, retiring president, as the principal feature, the program was keenly interesting.

The yacht trip arranged for Monday afternoon, while less elaborate, was another big success, and the final event of the colorful program was the banquet and dance given on the roof garden of the New Palm Beach hotel Tuesday night. More than five hundred doctors and their wives gathered in the exotically beautiful surroundings of the roof garden, and the event—the courtesy of the Wampole Company, of New York—set new standards of brilliance for convention entertainments.

Then, Wednesday morning—a delightful close to a perfect program—there was surf bathing in the blue waters of the Atlantic.

To Mrs. George M. Dawson, as chairman of the woman's committee, must go first credit for the perfect success of the entertainment planned for the doctors' wives, and the smoothness with which it was carried out.

A pamphlet entitled "Preliminary Report of the Commission on Medical Education" has recently been prepared and can be obtained, free of charge, by writing the Commission on Medical Education, 215 Whitney Ave., New Haven, Connecticut.

The newly appointed officers of the Florida Railway Surgeons' Association are as follows: Dr. J. S. Turberville, Century, president; Dr. C. W. Shackelford, West Palm Beach, vice-president; Dr. E. W. Warren, Palatka, sceretary-treasurer.

The regular meeting of the Suwannee River Medical Society, composed of Columbia, Hamilton, Madison and Suwannee Country Medical Societies, was held in Lake City on April 8th. The attendance was excellent. Dr. Eustace Long, Madison, president of the society, and Dr. J. D. Gable, Lake City, neuro-psychiatrist at the government hospital, read excellent papers. Dr. H. C. Von Dahm, medical officer in charge of the government hospital in Lake City, invited the society to meet with his staff at their next meeting.

On May 2nd, Dr. J. N. Fogarty tendered his resignation as mayor-commissioner of the city of St. Augustine.

At the meeting of the Pinellas County Medical Society, held Friday, April 22nd, at the Florida Art School, St. Petersburg, the following papers were read:

"Arteriosclerosis"—Dr. H. L. Putnam. Discussed by Dr. W. C. McConnell.

"Early Treatment of Acute Otitis Media and Mastoiditis"—Dr. M. H. Stuart. Discussed by Dr. N. W. Gable.

The Southern Pediatric Seminar has received a grant from the Commonwealth Fund for the purpose of giving scholarships to doctors in the various parts of the South. This scholarship will include $25.00 for tuition and $30.00 for board. These scholarships will be granted to men in towns or communities of 1,000 inhabitants or under. It is their desire to encourage men who have been out of college for a number of years and who have not taken postgraduate work to come for this course. All members of the Association desiring this scholarship are requested to forward their names without delay to the chairman of the Executive Committee of the Florida Medical Association, Dr. R. H. Mc-

Ginnis, 1463 Oak St., Jacksonville, in order that selections may be made for representatives from our Association.

Dr. B. S. Stutts, formerly of Munson, has recently moved to Dunnellon, where, in addition to his practice, he will act as surgeon for the Atlantic Coast Line Railway Company.

In the advertisement of the Victor X-ray Corporation, page vii, March issue, the insert "Atlanta: 155 Forrest Ave., N. E." should have appeared. This notation of their territorial branch was unintentionally omitted.

Dr. J. N. Fogarty, of St. Augustine, resigned as chief surgeon of the Florida East Coast Railway, effective May 15th. This information came as a surprise to Dr. Fogarty's many friends.

For the wives of the physicians the Palm Beach convention was of more than ordinary significance, since it marked the first annual meeting of the state auxiliary, organized during the fifty-third convention in Gainesville.

Postponing their meeting from Tuesday morning to Tuesday afternoon, in order that members might have the privilege of hearing the address of Dr. Lewellys F. Barker, of Baltimore, the auxiliary gathered in the spacious lounge of the Breakers immediately following the luncheon.

Mrs. Wilburn Lassiter, state president, outlining the work already accomplished during the first year of the auxiliary's existence, stated that organization already had been perfected in Lake, Sumter, Bradford, Pasco, Hernando and Citrus counties. Urging every member of the auxiliary to do her part, the president declared she wanted a one hundred per cent organization of all counties in the state when the association meets in Tampa next year.

Another speaker who added interest to the meeting was Mrs. C. W. Roberts, of Atlanta, president of the Woman's Auxiliary of the Georgia State Medical Society. Mrs. Roberts told of the work already accomplished by the auxiliary of her state, and her talk elicited keen interest among the members.

ROBERT LAFAYETTE HARRIS

Doctor Robert Lafayette Harris died at his home, 1727 Riverside Avenue, Jacksonville, April 27, 1927, of coronary thrombosis. His health had gradually declined for the past several years, but of late had been improved, so that the suddenness of his passing was a great shock to his friends and the community at large.

Dr. Harris was born in 1858, and graduated from the Medical College of Ohio, Cincinnati, in 1882. After taking extensive post-graduate courses, he located in Orlando, Florida, where he built up one of the largest surgical practices in the State and became the leading physician in his community. He operated very successfully a hospital in connection with his work. About 1909, desiring to enlarge the field of his activities, he moved to Jacksonville, where he purchased an interest in the former DeSoto Sanitarium. After several years of active work, his health beginning to fail somewhat and wishing to lighten his work, following an interest that was awakened by the earliest development of the X-ray, he took up this branch as a specialty. He became so proficient at this, as in other lines to which he had devoted himself, that he soon became a leader, and as such was recognized up to his death.

Dr. Harris held many positions of honor and trust during his lifetime. For several years he was a member of the original Board of Control of the Florida Farm Colony for Epileptics at Gainesville and rendered very valuable service in laying out plans for that institution. He was past president of the Orlando Medical Society.

Dr. Harris is survived by his widow, Mrs. Francis Harris, three sisters, Mrs. B. M. Nix and Miss Harriet Harris, both of Waycross, Ga., and Mrs. Mattie Caruth, Winder, Ga., four brothers, C. C. Harris, Clermont, Fla., Frank Harris, Statesboro, Ga., James Harris and Claborn Harris, of Commerce, Ga., and other relatives.

By all those who have known Dr. Harris he was loved and held in the greatest esteem. He was one of the oldest among us and his kindly good humor and pleasant personality made his friendship desired by everyone. The medical profession has suffered a definite break in its ranks which will be hard to fill.

H. D. VAN SCHAICK, M.D.,
Necrologist.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of THE JOURNAL OF THE FLORIDA MEDICAL ASSOCIATION, published Monthly at Jacksonville, Florida, for April 1, 1927.

STATE OF FLORIDA, } ss.
COUNTY OF DUVAL. }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Shaler Richardson, M.D., who, having been duly sworn according to law, deposes and says that he is the Editor of the JOURNAL OF THE FLORIDA MEDICAL ASSOCIATION and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

	Name of—	Post office address—
Publisher	Florida Medical Association, Inc.	Box 135, Jacksonville, Fla.
Editor	Shaler Richardson, M.D.	Box 135, Jacksonville, Fla.
Managing Editor		
Business Manager	Stewart G. Thompson, D.P.H.	Box 135, Jacksonville, Fla.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent or more of the total amount of stock should be given.)

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(This information is required from daily publications only.)

SHALER RICHARDSON
(Signature of editor, publisher, business manager, or owner.)

Sworn to and subscribed before me this 1st day of April, 1927.

(SEAL)

S. G. THOMPSON
Notary Public, State of Florida at Large.
(My commission expires April 2, 1928)

Form 3526.—Ed. 1923.

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